



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/711,364	09/14/2004	Ramgopal Darolia	152967	5363
30952	7590	12/06/2006		
HARTMAN AND HARTMAN, P.C. 552 EAST 700 NORTH VAIPARAISO, IN 46383				
EXAMINER IVEY, ELIZABETH D				
ART UNIT			PAPER NUMBER	
1775				

DATE MAILED: 12/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/711,364

Applicant(s)

DAROLIA ET AL.

Examiner

Elizabeth Ivey

Art Unit

1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Claims 20-43 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected method, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on September 21, 2006.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-19 are rejected under 35 U.S.C. 102(b) as being anticipated by WO99/35306 to Marijnissen et al.

Regarding claims 1, 4-6, 8-10, 12, 15, 17 and 18, Marijnissen discloses a multilayered columnar yttria, ceria, calcia scandia or lanthana or mixtures thereof stabilized zirconia (ceramic) thermal barrier coating on a turbine engine component such as a blade or vane. This structure includes inner, outer and interior layers. The engine component may or may not have a MAIY, MCrAlY, or aluminide (metallic) bond coat. Marijnissen discloses the columnar alternating ceramic layers to have different grain orientation directions, the angle of which may range from values approaching 0 degrees to those approaching 180 degrees that may form a herringbone

Art Unit: 1775

structure that modulates columns in parallel between inner and outer regions. Marijnissen discloses first orientations of the columnar structure as substantially normal to the surface of the substrate and second orientations not normal to the substrate. Marijnissen discloses additional ceramic layers may be provided with respective grain orientation directions, which are substantially similar thereby creating multiple first portions substantially normal to the surface of the substrate and multiple second portions separated by the first portions and not normal to the surface of the substrate wherein the columns are continuous but modulated within the interior regions (page 6 lines 19-31, page 7 lines 16-18, page 7 lines 22-29, page 8 lines 5-7 and 15-16 and page 22 line 18 and 3C-3D).

Regarding claims 2 and 13, Marijnissen discloses addition of layers by just changing the orientation of the article (substrate) relative to a target during deposition, thereby creating layers without discontinuous columns or discrete layers separated by interfaces (page 7 lines 1-13).

Regarding claims 3 and 14, Marijnissen discloses parallel columnar patterns such as a herringbone pattern, which produces columns that are equally spaced throughout all of the layer regions (page 7 lines 22-25).

Regarding claims 7 and 16, Marijnissen discloses columnar patterns such as a herringbone pattern produce a thermal barrier coating with a lower thermal conductivity (page 21 line 30 – page 22 line 1).

Art Unit: 1775

Regarding claims 11 and 19, Marijnissen discloses thermal barrier coating on a turbine engine component such as a blade or vane and although it is not explicitly stated, it includes the leading edge.

Claims 1-19 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,876,860 to Marijnissen et al.

Regarding claims 1, 4-6, 8-10, 12, 15, 17 and 18, Marijnissen discloses a multilayered columnar yttria, ceria, calcia scandia or lanthana or mixtures thereof stabilized zirconia (ceramic) thermal barrier coating on a turbine engine component such as a blade or vane. This structure includes inner, outer and interior layers. The engine component may or may not have a MAIY, MCrAlY, or aluminide (metallic) bond coat. Marijnissen discloses the columnar ceramic layers to have different grain orientation directions that may form a herringbone structure that modulates columns in parallel between inner and outer regions (column 4 lines 53-67, column 5 lines 7-52, column 15 lines 64-65).

Regarding claims 2 and 13, Marijnissen '860 discloses addition of layers by just changing the orientation of the article (substrate) relative to a target during deposition, thereby creating layers without discontinuous columns or discrete layers separated by interfaces (column 5 lines 7-52).

Art Unit: 1775

Regarding claims 3 and 14, Marijnissen '860 discloses parallel columnar patterns such as a herringbone pattern, which produces columns that are equally spaced throughout all of the layer regions (column 4 lines 63-67).

Regarding claims 7 and 16, Marijnissen '860 discloses columnar patterns such as a herringbone pattern produce a thermal barrier coating with a lower thermal conductivity (column 15 lines 34-37).

Regarding claims 11 and 19, Marijnissen '860 discloses thermal barrier coating on a turbine engine component such as a blade or vane and although it is not explicitly stated, it includes the leading edge (column 15 lines 64-65).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

Art Unit: 1775

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 11 and 19 are alternatively rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,455,173 B1 to Marijnissen et al. as applied to claims 1, 8, 10 and 12 above in view of U.S. Patent 6,126,400 to Nichols et al.

Regarding claims 11 and 19, Marijnissen discloses all of the limitations of claims 1, 8, 10 and 12 but does not explicitly state the coating is specifically on the leading edge of the component. However Nichols discloses airfoils with ceramic thermal barrier coatings and specifically discloses the ceramic coating is applied to the leading edge of airfoils in order to improve the thermal performance of the airfoil and allow it to operate at higher temperatures. Therefore it would have been obvious to a person having ordinary skill in the art at the time of the invention to apply the thermal barrier of Marijnissen to the leading edge of the airfoils in either a blade or vane.

Claims 11 and 19 are alternatively rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,876,860 to Marijnissen et al. as applied to claims 1, 8, 10 and 12 above in view of U.S. Patent 6,126,400 to Nichols et al.

Regarding claims 11 and 19, Marijnissen '860 discloses all of the limitations of claims 1, 8, 10 and 12 but does not explicitly state the coating is specifically on the leading edge of the component. However Nichols discloses airfoils with ceramic thermal barrier coatings and specifically discloses the ceramic coating is applied to the leading edge of airfoils in order to improve the thermal performance of the airfoil and allow it to operate at higher temperatures.

Art Unit: 1775

Therefore it would have been obvious to a person having ordinary skill in the art at the time of the invention to apply the thermal barrier of Marijnissen to the leading edge of the airfoils in either a blade or vane.

Response to Arguments

Examiner acknowledges cancellation of claims 20-42, and amendment to the specification and to claims 1 and 12.

Applicant's arguments filed September 21, 2006 have been fully considered but they are not persuasive.

Applicant argues that Marijnissen does not disclose a coating having an interior region comprising multiple first portions substantially normal to the surface of the substrate and multiple second portions separated by the first portions and not normal to the surface of the substrate. However, Marijnissen clearly and definitively discloses the columnar alternating ceramic layers to have different grain orientation directions, the angle of which may range from values approaching 0 degrees to those approaching 180 degrees that may form a herringbone structure that modulates columns in parallel between inner and outer regions. Marijnissen discloses first orientations of the columnar structure as substantially normal to the surface of the substrate and second orientations not normal to the substrate. Marijnissen discloses additional ceramic layers may be provided with respective grain orientation directions, which are substantially similar thereby creating multiple first portions substantially normal to the surface of the substrate and multiple second portions separated by the first portions and not normal to the

Art Unit: 1775

surface of the substrate wherein the columns are continuous but modulated within the interior regions as indicated above.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Ivey whose telephone number is (571) 272-8432. The examiner can normally be reached on 7:00- 4:30 M-Th and 7:00-3:30 alt. Fridays.

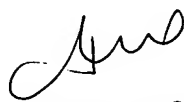
Art Unit: 1775

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Elizabeth D. Ivey



JENNIFER MCNEIL
SUPERVISORY PATENT EXAMINER
11/28/06